

Commission to eliminate. Market value cannot be used as a proper method of valuing plant in service.

28. The major problem with using either replacement cost or reproduction cost to value plant in service is the lack of an objective standard to determine how much it would cost to build new "state-of-the-art" facilities or to reconstruct the plant that is already in service. The experience with reproduction and replacement cost methodologies prior to the *Hope* Natural Gas case demonstrated that these methodologies burdened the regulatory process with endless debate. For this reason, these two valuation methodologies have been largely abandoned by state regulatory commissions.

29. Most importantly, net original cost is the standard used by regulators for valuing plant in service in the telecommunications industry. The use of market value, replacement cost, or reproduction cost methods to value cable company plant in service would increase cable company revenues and give them a competitive advantage. The Commission should regulate cable operators according to the same rules as the telecommunications industry to ensure equitable treatment as the cable and telecommunications industries converge. Accordingly, regulators should use the net original cost methodology to value the cable operators' plant in service in cost of service proceedings.

**B. Excess acquisition costs should not be included in rate base.**

30. Excess acquisition costs arise when a cable company pays more for an acquired cable property than the property originally cost to build. Because cable companies have acquired many cable properties at prices well in excess of original cost, excess acquisition costs represent more than half of the long-term assets of many cable companies. The Commission's decision either to include or exclude excess acquisition costs from rate base will have a significant effect on the cable operators' revenue requirements.

31. To understand why a cable operator would pay a multiple of original costs for another operator's cable assets, it is important to recognize that cable operators are essentially unregulated monopolists. Cable franchises are normally granted for a period of fifteen years with the right to renew if cable service is acceptable. In the overwhelming majority of local markets, cable operators face no competition. From 1986 until the passage of the Cable Television Consumer Protection and Competition Act of 1992, all cable operators in markets with at least three over-the-air broadcast signals were free to set monthly service rates and rate increases without regulatory approval. Cable operators have been willing to pay a multiple of original cost for other cable assets because they could collect monopoly rents on those assets. Allowing excess acquisition costs in rate base would lock in the monopoly

profits that cable operators expected to earn at the time they acquired additional cable properties.

32. Regulators have disallowed recovery of excess acquisition costs for firms in other regulated industries because the benefits of excess acquisition costs accrue to sellers rather than to ratepayers. Ratepayers should not have to pay higher rates for no additional benefits solely because cable operators have chosen to pay high prices for acquired properties. In addition, cable operators would have no incentive to minimize the cost of acquisition if they were allowed to include excess acquisition costs in rate base.

33. Excess acquisition costs should not be amortizable as an annual expense. Just as these costs should not result in higher rates by adding them to rate base, they also should not be passed through in the form of expense.

34. To ensure open competition between telecommunications and cable companies in the multimedia world, the Commission should apply the same rules regarding excess acquisition costs to both industries. Since excess acquisition costs are not included in rate base for telecommunications companies, they should not be included in rate base for cable companies.

**35. Disallowing excess acquisition costs in the ratebase does not mean that cable operators would be unable to recover their full acquisition costs. On the contrary, such a disallowance means only that cable operators could not recover the excess portion of acquisition costs from their regulated cable rates. The cable operators ability to recover excess costs from various unregulated services that they may offer now or in the future would not be affected by the disallowance of excess acquisition costs in ratebase.**

- C. The Commission should base depreciation rates for cable operators on original cost and the expected useful life of cable assets.**

**36. The policy of prescribing depreciation rates for cable companies based on original cost and the expected useful life of cable assets would be correct from both an accounting and an economic policy perspective. Accounting rules, which require the matching of expenses with revenues over the entire useful life of an asset, clearly support the original cost and expected useful life standards. From an economic policy perspective, the Commission can promote competition by applying the same depreciation rules to both cable and telecommunications companies. Cable companies currently depreciate their assets at a significantly faster rate than the telecommunications companies, thereby generating a larger cash flow for investment, even though the two industries deploy the same types of technologies and similar depreciable assets. Allowing cable companies to maintain their current depreciation policies would**

give them a significant competitive advantage over the telecommunications companies.

- D. Programming expense should not be a cost element for inclusion in rate base.**

37. Programming expense should not be included in rate base; in a cost of service proceeding to determining reasonable rates, these expenses are properly treated as a recoverable operating expense. Including programming costs in rate base would allow cable operators to maintain artificially high rates without any offsetting benefit to ratepayers. Since cable operators normally purchase programming, whether from outside vendors or their own programming subsidiaries, no incentive is necessary for programming expenses. Furthermore, the Commission should not allow a profit on programming expense because a profit has already been earned by the program producer.

#### **IV. MEASURES OF FINANCIAL PERFORMANCE**

- A. The Commission needs to establish uniform financial reporting procedures for cable operators that are similar to those currently in place in the telecommunications industry.**

38. A critical component of the Commission's cost of service regulations for cable is the standard that is used to measure cable operators'

financial performance. This standard determines whether regulated rates should be increased or decreased in a cost of service proceeding.

39. Many cable operators today report either negative or very small net income. However, the cable operators' net income figures are distorted by: 1) their rapid depreciation of cable assets; 2) their amortization of excess acquisition costs; and 3) the high interest expenses associated with their heavy reliance on debt, at least a portion of which has been incurred to finance excess acquisition premia. Their reported net income, therefore, does not provide an appropriate measure of the cable industry's financial performance.

40. To properly measure the cable operators' financial performance, cable operators should be required to restate their financial results to conform to the regulatory standards of the Commission. These uniform standards should be consistent with those already required for telecommunications firms, who are required to keep a set of regulatory books that sometimes differ from their financial books. By requiring cable operators to develop uniform standards consistent with those used in regulating telecommunications companies, the Commission can avoid the distortions in cable operators' financial statements caused by rapid depreciation, amortization of excess acquisition costs, inclusion of excess acquisition costs in rate base,

and the interest expenses associated with the debt financing of excess acquisition costs.

41. The Commission also needs to develop standards and monitoring procedures for the allocation of joint costs and the costs of affiliated transactions. If the Commission does not develop uniform reporting procedures like those in place for the telecommunications industry, regulation of cable operators seeking rates in excess of the Commission's benchmarks and price caps will be ineffective.

42. With a uniform set of financial standards and monitoring procedures for the cable industry, the Commission would be able to determine whether cable operators are charging excessive rates by comparing the cable operators' revenue requirements to their regulated revenues. The Commission could identify a cable operator's total revenue requirement using the standard formula,  $[\text{expenses} + (\text{fair rate of return} \times \text{rate base})]$ , and assess whether the revenue requirement was in excess of or less than its regulated revenues. Developing and applying financial accounting standards similar to those applied to the telecommunications industry would allow the Commission to assess whether the cable operators' rates were justified.

**AFFIDAVIT OF JAMES H. VANDER WEIDE**

I, JAMES H. VANDER WEIDE, being duly  
sworn, depose and say that the foregoing testimony and exhibits are true  
and correct to the best of my knowledge and belief.

James H. Vander Weide  
James H. Vander Weide

Subscribed and sworn to  
before me this 23rd day  
of August 1993.

Sandra S. Talley  
Notary Public

My Commission Expires ~~By Statute Expires 10/1/95~~



**QUALIFICATIONS OF  
DR. JAMES H. VANDER WEIDE**

**James H. Vander Weide is Research Professor of Finance and Economics at the Fuqua School of Business, Duke University. Dr. Vander Weide is also founder and President of Financial Strategy Associates, a consulting firm that provides strategic, financial, and economic consulting services, including cost of capital studies. He has testified on the cost of capital and other regulatory issues in more than 160 cases before the U. S. Congress, the Federal Communications Commission, the National Telecommunications and Information Administration, the Federal Energy Regulatory Commission, the public service commissions of twenty-nine states, and the insurance commissions of five states. He has also engaged in special research projects and designed financial software packages for firms in the banking, electric, gas, insurance, telephone, and water industries.**

**Educational Background and Prior Academic Experience**

**Dr. Vander Weide holds a Ph.D. in finance from Northwestern University and a B.A. from Cornell University. In January 1972, he joined the faculty of the School of Business at Duke University and was subsequently named Assistant Professor, Associate Professor, and then Professor. In 1982, he assumed the position of Associate Dean of Faculty Affairs at the Fuqua School. He resigned this position in July 1983 and is now Research Professor of Finance and Economics.**

Since joining the faculty at Duke University, Dr. Vander Weide has taught courses in corporate finance, investment management, and management of financial institutions. He has also taught courses in statistics, economics, and operations research, and a Ph.D. seminar on the theory of public utility pricing.

In addition to his teaching in the full-time educational programs of the Fuqua School of Business, he has been active in executive education at Duke. Dr. Vander Weide helped design the Duke Advanced Management Program at the Fuqua School of Business and served as Program Director for this program for five years. Dr. Vander Weide now serves as Program Director and/or teacher in many executive programs designed to prepare managers for the competitive environment in American industry. In 1989, Dr. Vander Weide designed and initiated a three-week executive program for Soviet manager development, the first executive program in the United States designed exclusively for Soviet managers. The program continues for managers from the former Soviet republics since the breakup of the Soviet Union. He continues to deliver a nationally prominent program on the Cost of Capital for firms in regulated industries.

### **Publications**

Dr. Vander Weide has written a book entitled *Managing Corporate Liquidity: An Introduction to Working Capital Management* for John Wiley and Sons, Inc., which was published in August, 1984. He has also written a chapter on "Financial Management in the Short Run" for *The Handbook of Modern Finance*, and written

research papers on such topics as portfolio management, capital budgeting, investments, the effect of regulation on the performance of public utilities, and cash management. His articles have been published in *American Economic Review*, *Financial Management*, *Journal of Finance*, *Journal of Financial and Quantitative Analysis*, *Journal of Bank Research*, *Journal of Portfolio Management*, *Journal of Accounting Research*, *Journal of Cash Management*, *Management Science*, *Atlantic Economic Journal*, *Journal of Economics and Business*, and *Computers and Operations Research*.

#### **Professional Experience in the Regulatory Field**

Dr. Vander Weide has provided cost of capital studies and other financial consulting services to firms in the electric, gas, insurance, telecommunications, and water industries for over fifteen years. He also testified on the cost of capital and other regulatory issues before the U. S. Congress, the Federal Communications Commission, the Federal Energy Regulatory Commission, the National Telecommunications and Information Administration, the public service commissions of twenty-eight states, and the insurance commissions of five states. He worked for Bell Canada on a special task force to study the effects of vertical integration in the Canadian telephone industry. Dr. Vander Weide has provided consulting and expert witness testimony to the following companies:

### **Telephone Companies**

**ALLTEL and its subsidiaries**  
**Ameritech**  
**AT&T Communications**  
**Bell Atlantic and its subsidiaries**  
**Bell Canada**  
**BellSouth and its subsidiaries**  
**Centel and its subsidiaries**  
**Cincinnati Bell**  
**Citizens Telephone Company**  
**Concord Telephone Company**  
**Contel and its subsidiaries**  
**GTE Corporation and its subsidiaries**  
**Heins Telephone Company**  
**NYNEX and its subsidiaries**  
**Pacific Telesis and its subsidiaries**  
**Southern New England Telephone**  
**United Telecommunications and its subsidiaries**  
**Woodbury Telephone Company**

### **Water, Electric and Gas**

**American Water Works Service Company**  
**Carolina Power and Light**  
**Iowa Southern**  
**Kentucky Power Company**  
**Midwest Resources and its subsidiaries**  
**Nevada Power Company**  
**North Carolina Natural Gas**  
**Northern Illinois Natural Gas**  
**PacifiCorp**  
**Public Service Company of North Carolina**  
**South Carolina Electric and Gas**

### **Insurance Companies**

**Allstate**  
**North Carolina Rate Bureau**  
**United Services Automobile Association (USAA)**  
**The Travelers Indemnity Company**

### **Other Professional Experience**

Dr. Vander Weide, in conjunction with his firm, has hosted a nationally prominent conference/workshop on determining the cost of capital where legal and financial executives from utilities and regulatory bodies have studied the strengths and weaknesses of the various approaches to estimating a company's cost of capital. In addition, he has conducted seminars and training sessions for executives in both regulated and unregulated industries on financial analysis, competitive strategy, financial strategy, capital budgeting, cost of capital, cash management, depreciation policies, and short-run financial planning.

In the 1970's, Dr. Vander Weide helped found University Analytics, Inc., one of the fastest growing small firms in the country. As an officer at University Analytics, he designed cash management models, databases, and software packages that are used by most major U. S. banks in consulting with their corporate clients. Having sold his interest in University Analytics, Dr. Vander Weide now concentrates on strategic and financial consulting, academic research, and executive education.

## Appendix 2

### The Average Cost of Capital for the S&P Industrials

	<u>Percent</u>	<u>Cost Rate</u>	<u>Weighted Cost</u>
Debt	40.55	7.91	3.21
Equity	59.45	14.58	8.67
Average Cost of Capital			<u>11.88%</u>

### Appendix 3

**The Implied Rate of Return on Equity  
for the Cable Industry  
Using an 11.88 Percent Fair Rate of Return**

	<u>Percent</u>	<u>Cost Rate</u>	<u>Weighted Cost</u>
Debt	86.00	7.80	6.71
Equity	14.00	36.93	5.17
Average Cost of Capital			<u>11.88%</u>

**Appendix 4**

**The Implied Rate of Return on Equity  
for the Cable Industry  
Using an 11.25 Percent Fair Rate of Return**

	<u>Percent</u>	<u>Cost Rate</u>	<u>Weighted Cost</u>
Debt	86.00	7.80	6.71
Equity	14.00	32.43	4.54
Average Cost of Capital			<u>11.25%</u>



**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Implementation of Sections of	)	MM Docket 93-215
the Cable Television Consumer	)	
Protection and Competition Act	)	
of 1992 Rate Regulation	)	

**DECLARATION OF ROBERT L. TOWNSEND**

Robert L. Townsend deposes and says:

1. My title is Director of Bell Atlantic Video Services Company ("BVS"). I have worked in the cable TV industry for over a decade. Before joining BVS, from 1989 to 1992, I was Senior Vice President of a subsidiary of the Home Shopping Network, which is a producer of video programming sold to cable systems. Prior to that, from 1981 to 1989, I was Vice President, Sales, Marketing, and Programming of New York Times Cable TV. In addition, I have served as a member of the board of directors of the Cable Television Administration and Marketing Society ("CTAM") and was President of the Northeast Region of CTAM. I have substantial experience in the cable industry from the perspectives of both a cable operator and an independent video programmer.

2. Based on my experience in the cable industry, I submit this declaration in order to highlight the ongoing activities being undertaken by cable operators that improve productivity.

3. In a recent report A. G. Edwards & Sons analysts stated that "[t]he cable industry may be on the verge of a new growth

cycle based on technologies that allow a significant expansion of channel capacity and more efficient distribution of programming and data transmission."<sup>1</sup> There is every reason to believe this will be the case since cable's productivity is already improving. Penetration rates are rising steadily, and it is well established that per-subscriber costs fall as the number of subscribers per mile of cable rises. At the same time, the industry is replacing coaxial cable with glass and deploying compression technology to increase considerably the number of channels that can be carried. Properly averaged and amortized, these technological improvements both reduce costs and increase the capacity or capabilities of a cable network. Both effects reduce per-subscriber, per-channel costs; both thus boost productivity.

4. Scale Economies. -- Between 1980 and 1992, cable subscribership roughly tripled. Table 1. At present, slightly more than 60 percent of households subscribe,<sup>2</sup> and subscribership is likely to continue growing steadily.<sup>3</sup> If its underlying assumptions are correct, the Commission's rate regulation will itself almost certainly increase subscribership: in competitive

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<sup>1</sup> M. A. Kupinski, A. G. Edwards & Sons, Inc., Comcast Corporation -- Company Report (Apr. 22, 1992).

<sup>2</sup> NCTA, Cable Television Developments 1-A (June 1993).

<sup>3</sup> One cable company CEO has predicted that penetration rates, now around 60 percent, will rise to 70 percent by the end of the century and to 80 percent by the year 2010. "Cable television," he claims, "is going to be as universal as electric light and universal gas." Cynthia Marshall, Tow Takes Century Communications to Forefront of Technology, Fairfield County Bus. J., July 12, 1993, §1, at 6.

cable systems, with lower prices, average penetration rates are generally much higher than the national average.

5. These increases in subscribership entail relatively few additional costs. One of the major costs of providing cable service is laying the cable in the first place.<sup>4</sup> Cable now passes 98 percent of American TV households.<sup>5</sup> Once the distribution backbone is in place, cable companies can add subscribers with little additional capital investment. Or, stated another way, the productivity of existing cable plant will rise steadily. G. K. Webb's analysis of data from New Jersey concluded that per-subscriber costs decline 50 percent when penetration rises from 20 to 80 percent.<sup>6</sup> Webb similarly found a scale elasticity of 4.6 at a penetration rate of 50 percent.<sup>7</sup> Scale elasticities greater than

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<sup>4</sup> See G. Kent Webb, *The Economics of Cable Television* (1983); Jane B. Henry, *The Economics of Pay-TV Media*, in *Video Media Competition: Regulation, Economics, and Technology* 21 (Eli M. Noam, ed. 1985) ("Urban cable systems have the capital characteristics of a modern battleship -- a colossal sunk cost").

<sup>5</sup> NCTA, *Cable Television Developments* 1-A (June 1993).

<sup>6</sup> G. Kent Webb, *The Economics of Cable Television* 59, 61 (1983). Webb found that in a distribution network of 1,000 cable miles with a 36-channel capacity and a density of 100 households per cable mile, per-subscriber costs for a 20 percent penetration rate were approximately \$18. When the penetration rate rises to 40 percent, per-subscriber costs drop to under \$14. *Id.* at 61. When penetration reaches 80 percent, costs drop to about \$9 per subscriber. *Ibid.*

<sup>7</sup> *Id.* at 59. Other commenters have concurred that scale elasticities greater than one are present in the cable industry, though they have considered Webb's estimates to be too high. Thomas Hazlett, *Duopolistic Competition in Cable Television: Implications for Public Policy*, 7 *Yale J. on Reg.* 65, 71 (Winter, 1990); Eli M. Noam, *Economies of Scale in Cable Television: A Multiproduct Analysis*, in *Video Media Competition: Regulation, Economics, and Technology* 93 (Eli M. Noam, ed. 1985); Owen &

one indicate that per-subscriber costs fall as the number of subscribers rises.<sup>8</sup>

6. In addition, cable operators have begun to consolidate systems -- clustering larger systems and merging smaller ones -- and are eliminating headends by using one centralized headend to serve a number of adjacent systems. These actions allow for greater sharing of equipment costs and result in even lower per subscriber costs.

7. Compression. -- In December 1992, TCI announced plans to deploy compression technology that will boost the capacity of existing networks to 500 channels by early 1994.<sup>9</sup> Recently developed compression algorithms and processors for implementing them provide at least 10-to-1 compression of video signals -- a tenfold increase, in other words, in the productivity of existing cable plant and ancillary costs of maintenance.<sup>10</sup>

8. Other technologies are having similar effects. In November 1992, for example, Zenith Electronics Corp. announced a new digital modulation technology that doubles the capacity of

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Greenhalgh, Competitive Considerations in Cable Television Franchising, 4 Contemp. Pol'y Issues 69 (1986).

<sup>8</sup> G. Kent Webb, The Economics of Cable Television 59 (1983).

<sup>9</sup> 500 Channels and Nothing to Watch: The U.S.'s Largest Cable Operator is Switching to Compressed-Digital TV, Time, Dec. 14, 1992, at 22.

<sup>10</sup> As financial observers have noted, compression "greatly cuts the costs of running both satellite and cable television channels." Raymond Snoddy, Television Transmitter Seeks Flotation, Financial Times, Aug. 10, 1993, at 15.

cable television channels independently of any compression.<sup>11</sup> When compression is added, this new transmission system will deliver as many as 23 movie channels, nine live video channels or two full HDTV channels for each 6-Mhz channel currently on the system.

9. Any increase in the number of channels on a cable system itself marks a major improvement in productivity. The existence of more channels will also have an indirect impact on productivity that may be even larger. To begin with, more channels attract more viewers<sup>12</sup> -- and thus improve economies of scale. Networks with hundreds of channels will be able to provide enhanced pay-per-view services, for example, which will permit cable companies to compete for the \$14 billion video rental business.<sup>13</sup> At the same time, more channels also make cable a much more productive vehicle for advertising, because "narrowcasting" permits more accurate targeting of commercials.<sup>14</sup> In the analogous market for magazines,

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<sup>11</sup> Cable TV Transmission Breakthrough Doubles Digital Video Information Without Additional Compression, PR Newswire, Nov. 17, 1992.

<sup>12</sup> See Bruce M. Owen & Steven S. Wildman, Video Economics 214 (1992).

<sup>13</sup> See M. A. Kupinski, A. G. Edwards & Sons, Comcast Corporation - Company Report (April 22, 1992). The increase in capacity could, according to A. G. Edwards & Sons, "accelerate the cash flow growth of the cable industry above the 10% to 12% rate expected over the next several years, possibly to the 15% area."

<sup>14</sup> As explained by Ron Schneier, VP-sales, Arts & Entertainment Network, "[a]s the market becomes fragmented, there's more opportunity for advertisers to target their true consumers." Junu Bryan Kim, Step Aside for the 500-Channel Elephant; Rules Are Changing in Giant Ad Environment, Advertising Age, April 19, 1993, at S2.

advertisers pay much higher rates per reader in specialty, smaller circulation magazines.<sup>15</sup>

10. Compression will also sharply reduce the cost of delivering programming to the headend of cable networks. For example, two Canadian cable networks, The Movie Network and the Home Shopping Channel, are already using digital compression, the former to deliver four movie channels at the cost of one, the latter to slash the cost of delivering a single channel.<sup>16</sup>

11. Fiber Optics. -- The National Cable Television Association estimates that cable operators' use of fiber optics has increased 600 percent since 1988 and will continue to rise 25 percent annually throughout the decade.<sup>17</sup> TCI claims that it is now the largest single buyer of fiber-optic cable in the world. By 1996, some 90 percent of TCI's customers in its service areas will be linked by fiber. Other cable companies are engaged in similar programs.

12. According to an analysis by A. G. Edwards & Sons:

A fiber system offers the cable operator a number of important characteristics including 1) reduction in signal degradation, thus requiring fewer signal amplifiers; 2) increased system capacity, which could offer added services like data transmission and interactive television; 3) more cost

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<sup>15</sup> Ibid. Adding channels also increases cable operator's "inventory." Each additional channel represents 4 thirty second spots per hour, or 35,040 spots per year.

<sup>16</sup> Brian Gorman, How Deathstars and Other Space-age TV Gizmos Will Affect You at Home, Toronto Star, Feb. 28, 1993, at C1.

<sup>17</sup> Dep't of Commerce, 1992 U.S. Industrial Outlook 30-13 (Jan. 1992) (citing the NCTA).

efficiency than coaxial cable, especially in cable rebuilds; and 4) a longer life than a coaxial system.<sup>18</sup>

A. G. Edwards concludes that "a fiber optic system could increase system capacity, lower maintenance costs and reduce costly service calls to the subscriber."<sup>19</sup> Cable companies have reached similar conclusions themselves.<sup>20</sup>

13. While replacing coax with fiber does entail new investment, productivity increases even more. According to Paine Webber, "the implementation of new technology and applications will be essentially self-funding, as the combination of operating efficiencies via fiber optic cable and incremental cash flow will allow additional investment to be quickly amortized."<sup>21</sup>

14. That projection is well founded. Fiber is much cheaper to maintain than coax,<sup>22</sup> and it lasts longer.<sup>23</sup> Fiber also reduces the number of amplifiers needed along a cable network (and

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<sup>18</sup> M. A. Kupinski, A. G. Edwards & Sons, Comcast Corporation - Company Report (April 22, 1992).

<sup>19</sup> Ibid.

<sup>20</sup> TCI to Build \$2 Billion Fiber System Over Four Years, Telephone News, Apr. 19, 1993 ("Fiber gives us the added advantage of being able to transmit undistorted TV pictures over long distances using less transmission equipment and fewer satellite earth stations and headends," according to Richard Rexroat, TCI vice president-engineering).

<sup>21</sup> C. Dixon, Paine Webber Inc., Sneak Previews - Industry Report (May 19, 1992).

<sup>22</sup> In 1990, Donaldson, Lufkin & Jenrette noted that "[m]aintenance costs for copper are high and rising, while those for fiber are significantly lower and falling." P. A. Sekula, Donaldson, Lufkin & Jenrette, Fiber optics - Industry Report (October 1, 1990).

<sup>23</sup> G. Kent Webb, The Economics of Cable Television 49 (1983).

therefore the need to balance amplifiers).<sup>24</sup> Optical amplifiers are also improving rapidly. AT&T recently announced the deployment of optical amplifiers, which eliminate the need to convert optical to electric and back again, and support transmission distances three times longer than traditional signal regenerators.<sup>25</sup> A similar amplifier has been developed specifically for cable companies.<sup>26</sup> Donaldson, Lufkin & Jenrette estimates that the replacement of coax with fiber has the potential to reduce operating costs by 25 percent and powering costs by 30 percent.<sup>27</sup>

15. The deployment of fiber will also increase channel capacities enormously, at very little extra cost per channel.<sup>28</sup>

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<sup>24</sup> Dale N. Hatfield, who testifies regularly on behalf of cable companies, has estimated that fiber systems would need "maybe 5 amplifiers in a row rather than 20 or 30 amplifiers in a row that you would get today in the conventional system as it is set up today with all coax." Tr. at 3671, In re Alternative Regulatory Frameworks for Local Exchange Carriers, I.87-11-033 (Cal. PUC Jan. 27, 1989). See also P. A. Sekula, Donaldson, Lufkin & Jenrette, Fiberoptics - Industry Report (October 1, 1990); K.M. Leon, Bear, Stearns & Co., Inc., Telecommunications Services - Industry Report (Nov. 21, 1991).

<sup>25</sup> Network World, July 19, 1993, at 19.

<sup>26</sup> C-COR Announces New Flexnet Amplifier to be Displayed at NCTA Show, PR Newswire, June 7, 1993.

<sup>27</sup> P. A. Sekula, Donaldson, Lufkin & Jenrette, Fiberoptics - Industry Report (October 1, 1990).

<sup>28</sup> Time Warner officials, for example, point out that by using compression the 150 channels currently delivered over its fiber-optic Quantum system in Queens, New York can be boosted to 1,500. 500 Channels and Nothing to Watch; The U.S.'s Largest Cable Operator Is Switching to Compressed-Digital TV, Time, Dec. 14, 1992, at 22. HydraLite, Inc. is developing technology to carry over 50,000 channels over fiber. Optelecom, Hydralite Joint Venture to Develop Fiber Optics, Telecommunications Alert, May 11, 1993.



Fiber, like compression, will thus bring about additional productivity gains by increasing subscribership and improving the efficacy of commercial advertising.

16. Finally, fiber systems will enable companies to provide PCS, landline voice, data links, interactive applications, and other entirely new services over their networks. These may well represent perhaps the largest productivity gains of all.<sup>29</sup> Grafting voice telephone service onto networks previously capable of providing only video will permit cable companies to challenge local exchange telephone companies directly, once again at a relatively modest marginal cost. No one can yet quantify the productivity gains that are likely to flow from the convergence of video and voice markets, but it is reasonable to assume that they will be very significant.

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<sup>29</sup> Junu Bryan Kim, Step Aside for the 500-Channel Elephant: Rules Are Changing in Giant Ad Environment, Advertising Age, April 19, 1993, at S2.